VIBRATORY THERAPEUTICS.—THE APPLICATION OF RAPID AND CONTINUOUS VIBRATIONS TO THE TREATMENT OF CERTAIN DISEASES OF THE NERVOUS SYSTEM.

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THE first tentatives of the method of what I wish to speak to-day: *The treatment of certain diseases of the nervous system by mechanical vibrations*, go back to 1878, and originated with M. Vigoroux. This physician first watched the effects of mechanical vibrations on a certain number of hysterical patients. An enormous tuning-fork, mounted on a sounding-box, was set in action by means of a bow. Thanks to this agency, Vigoroux succeeded in dispersing the hemianæsthesia and causing the cessation of the contractures almost as rapidly as with the magnet or electric spark.

In a case of locomotor ataxia, he succeeded in subduing the painful crises by placing the legs of the patient in the sounding-box. In short, a certain number of experiments, repeated at different times, showed that the vibrations of a tuning-fork have exactly the same physiological action as the metals, the magnet, and static electricity.

Although the following year Schiff arrived theoretically at the same conclusion, these researches were not followed up. It was not till 1880 that Boudet, of Paris, took up the question again and obtained important results. His article "On the Treatment of Pain by Mechanical Vibrations" was published in *Progrès Medical*, February 5, 1881.

This electrician studied especially the vibrations in their local effects in the treatment of neuralgias. He made use of a tuning-fork, electrically mounted. To the little board serving as support for the instrument, at the point where the vibrations are most intense, he adapted a thin copper rod, of ten centimeters, terminated by a small disk. This disk was applied to the part of the body which it was intended to influence by the vibrations; and in order better to localize the latter, the disk was made to end in a rather blunt point.

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[1] Translated by E. P. Hurd, M.D.

The vibrating rod applied to any part whatever of the body of a healthy subject produced quite rapidly a local analgesia, and even a very marked anæsthesia, during from eight to twenty minutes. The effects were the more prompt and complete: 1. The nearer to a sensory nerve the vibrations were applied. 2. The less thick the dermic tissues and the more resistant the planes on which they reposed. The maximum of effect was obtained on the face, and in particular on the forehead, on the gums, etc.

In this way he was able to cure quite promptly some severe neuralgias, facial neuralgia, in particular, very intense migraines, very frequent vibrations being required. He claims to have cured himself by this process of an attack of migraine of great severity.

"When," he says, "the instrument is applied to the face, the cranium vibrates, and the subjects thus treated experience either a commencement of vertigo or a very marked disposition to sleep."

Shortly after the publication of this article, Dr. Jennings, of England, published in *Progrès Medical* a letter, in which he claimed the priority of this mode of treatment for Dr. Mortimer Granville, of London, who, he affirmed, had been for four years treating pain in the same way, and had even invented an instrument for this purpose, the "percuteur," which had been, moreover, experimented with in the hospitals of Paris with a relative success. Boudet replied to this letter, but did not continue his researches in this direction.

Mortimer Granville, on the contrary, published in 1883 the results which the vibratory method had given him in the treatment of certain diseases of the nervous system.[2] The process which he employed did not differ materially from that of Boudet, of Paris. Like the latter, he proposed always to act locally. The mechanism of his "percuteur" was much like that of clock-work, consisting of a simple train of cogged wheels worked by a spring, and acting on a lever which carried an ivory hammer with an indicator to show speed, and a screw movement to control it. The results obtained by Granville were remarkable, particularly in facial neuralgia; but the triumph of the "percuteur" was especially seen in neurasthenia of cerebral or spinal form, and in migraine.

I have mentioned these methods of treatment on account of their general interest, and because I shall have to refer to them again in the course of this clinical lecture.

I had long been told by patients affected with paralysis agitans that they derived great relief from prolonged journeys by railroad or in carriage. During their journeyings, the painful sensations which they had been in the habit of feeling seemed remarkably to undergo mitigation, and the benefit persisted for some time after the journey was over.

I had many times pointed out these facts to my pupils and had suggested the possibility that good effects might be obtained in Parkinson's disease by communicated movements similar to those of a carriage in motion, when a gentleman in the audience, Dr. Jégu, promised to devise an apparatus that should realize these desiderata. Aided by a distinguished engineer, M. Soligny, he constructed an arm-chair provided with a special mechanism which communicated rapid movements of oscillation around an anterior and lateral axis. These movements, combined and opposed, produced a trembling movement very much like what you experience when riding on the seat of an open wagon, as you can judge by sitting in this arm-chair.

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[2] Nerve Vibration and Excitation as Agents in the Treatment of Functional Disorder and Organic Disease. London: Churchill, 1883, in 8vo, 128 pages, with fig. The first article of Mortimer Granville appeared in the Lancet, February 19, 1881, page 286.

After completing his apparatus, Jégu made several trials at the Salpêtrière. Unfortunately his death, which happened about then, interrupted them; but at my request my former clinical chief, Dr. Gilles de la Tourette, has consented to continue the experiments of Dr. Jégu. These experiments have thus far pertained to eight subjects: six men and two women.

Without attempting to analyze one by one the results which have been obtained, I think that we can nevertheless have a fair understanding of the *modus operandi* of this treatment. The amelioration generally begins to be felt by the fifth or sixth séance of trepidation. It pertains especially to the painful phenomena which so often accompany paralysis agitans.

As soon as he comes down from the trepidant-chair, the patient feels lighter; his stiffness is gone; he walks with more ease than before. An almost constant phenomenon—the nights become good; the patient, who before was agitated incessantly in his bed, sleeps a quiet sleep, which brings him great satisfaction. Save in one case, the trembling has not seemed to be much influenced.

This *bien être* is experienced especially on the day of the treatment; hence the necessity of having séances daily. Unfortunately, this is difficult at the Salpêtrière, for the mechanism of the trepidant-chair is set in operation by an electric motor, and it is necessary to reserve three times a week the electricity which it furnishes to work the static machines. Moreover, the séances have not perhaps been sufficiently prolonged. In fact, it is difficult when we have so many patients to treat to give to each one more than a quarter of an hour. We hope soon to be able to do better. However this may be, the results obtained have been very encouraging; the trials will be continued, and I shall have occasion to speak to you of them again.

It is already no small gain to be able to relieve the sufferings of the victims of paralysis agitans, a disease on which ordinary remedies act with little efficacy, as you know.

My clinical chief did not limit himself to watching the action of the *trepidant-chair* in Parkinson's disease; he has sought for other applications of the vibratory method.

Struck by the results obtained and described by Boudet, of Paris, and Mortimer Granville, having remarked that the first of these writers had advanced the hypothesis that the local vibrations communicated to the face diffused themselves thoughout the entire cranial covering and set the cerebrum in vibration, he caused to be constructed by two electricians, M.M. Larat and Gautier, assistants to M. Gaiffe, an apparatus destined to impress upon the cranium intense vibrations.

The apparatus is made thus: It is composed of a sort of a helmet with separate concentric laminæ, very similar to the oval "conformator," formed of mobile pieces, which hatters use to take the measurement of heads. By the aid of a simple artifice the mobile pieces or laminæ of this helmet exactly fit the head of the subject under experimentation. The helmet is surmounted by sort of flat tray, on which is placed a little special motor made to work by an ordinary battery. All the apparatus is easy to manage, very easily worn, and its machinery can be kept going without interruption and without fear of derangement. The little motor makes about six hundred turns a minute, all very regular, producing a uniform vibration, which is transmitted to the cranium in its totality by the intermediation of the mobile pieces of the helmet. The whole cranium vibrates, as you can assure yourself by placing the hand on the mastoid process.

The apparatus when working gives out a continuous sound, a sort of gentle buzzing, which it is not perhaps indifferent to note from the point of view of the pathogeny of the results obtained. One can at will augment or diminish the number and the amplitude of the vibrations by a very simple regulator.

This vibrating helmet placed on the head of a healthy subject is perfectly well borne, and its working does not cause any inconvenience. At the end of seven or eight minutes the subject has a sensation of torpor (*engourdissement*) which invades the whole body and almost invariably leads to sleep. In fact, experiment has shown that a séance of ten minutes, made about six o'clock in the evening, procures a calm sleep on the corresponding night. Eight to ten séances triumph over *insomnia* when this is not dependent on an organic affection of the encephalon.

In three cases, the vibration proved to be very efficacious in aborting attacks of migraine. This was exactly the experience of Boudet, as before stated.

Three persons affected with *neurasthenia* were treated in this way; two got well; the third gave up the treatment while making a decided improvement, though not yet cured.

The vibration acts by causing disappearance, first, of the cephalic symptoms, in particular, the vertigo and the tight-bound feeling, the oppression so special to this affection. What favors the view that the vibrations make their action felt particularly on the encephalon, is that in one case when the spinal symptoms were predominant, the sacral tenderness, the weakness of the lower limbs, the relative sexual impotence disappeared without the need of resorting to vibrations along the vertebral column. In this case, static electricity had completely failed.

It is not, then, doubtful that the vibration thus practiced is a powerful sedative of the nervous system.

We know that alienists have long been in the habit of using in the treatment of certain forms of mental alienation trans-cerebral currents of low intensity, and it is quite conceivable that the rapid vibrations propagated to the encephalon may induce salutary modifications. In one case of *melancholic depression* very favorable results were obtained, and the vibration seemed to have arrested the course of an attack, which at the time when treatment was commenced did not show any indication of retrocession.

I cannot further pursue the subject at present; for the experimental trials, as you see, are but just under way; but what I have pointed out to you is sufficient to show you the advantages which may be derived from *vibratory medicine.*

THE TREATMENT OF NEURASTHENIA BY NERVOUS TRANSFUSION.

Constantin Paul, following out the idea of Brown-Sequard, is establishing an analogous plan of treatment, by making use of a transfusion of nervous matter to combat neurasthenia. In order to do this, he takes a certain quantity of the brain of a sheep recently killed, macerates it in glycerine, filters in D'Arsonval's apparatus; that is to say, in a porcelain filter, through which the liquid passes under 40 to 50 atmospheric pressures of carbonic acid gas. The liquid thus obtained is a solution of the nervous substance, of about 1 to 10, which will keep for nearly ten days without alteration. He makes injections under the skin of about 4 or 5 c.c., which is repeated four or five times daily. After an injection, the patient experiences a feeling of *bien faisance*, and as yet the author has seen no untoward results follow. He has treated, in this way, three cases of neurasthenic chlorosis, three of ordinary neurasthenia, a like number of tabes dorsalis, and a case where the only symptom seemed to be a chronic condition of slow pulse. The first-named cases were cured completely, the ataxics were very much benefited, insomuch as the fulgyrating pains disappeared, and the gait was re-established, and in one of the cases indeed the reflexes returned; in all the amelioration was considerable. In speaking of the nature of neurasthenia, the author compares the nervous system which allows of its manifestation as an accumulator which needs charging, and that the transfusion of the before-mentioned nervous matter fulfills this "long-felt want" (Jour. de méd. et Chirurg., March 10, 1892). J. C.